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Appendix M

Draft Environmental Offset Strategy

QUEENSLAND PACIFIC METALS

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QPM Energy Project

Environmental Offset Strategy

Prepared for QPM Energy Pty Ltd

March 2023

QPM Energy Project

Environmental Offset Strategy

QPM Energy Pty Ltd

E221146 RP1

March 2023

Version	Date	Prepared by	Approved by	Comments
1	22 February 2023	Andrew Jensen	Berlinda Ezzy, Anna McRae and Susan Lodge	
2	9 March 2023	Andrew Jensen	Berlinda Ezzy, Anna McRae and Susan Lodge	

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1 Introduction

Queensland Pacific Metals (QPM) Energy is the proponent of the QPM Energy Project (the Project). The Project involves the design, construction, and operation of a gas compression facility (GCF) and a high-pressure pipeline that links the proposed GCF to the nearby existing and operational North Queensland Gas Pipeline (NQGP).

The Project proposes to collect waste coal mine gas at the proposed GCF via waste gathering lines from existing adjacent mines. At the GCF, waste coal mine gas will be dehydrated and filtered, with the remaining clean gas then compressed and transported via high-pressure pipeline to the existing and operational NQGP. The NQGP will then transport the compressed gas north to Townsville, where it will be depressurised and distributed, by a third party, to industrial users, including QPM's Townsville Energy Chemicals Hub (TECH) Project.

EMM Consulting Pty Limited (EMM) has been commissioned to undertake ecological assessments for the Project including the identification of environmental matters prescribed at Commonwealth and State levels across the Project area and associated impact assessments. EMM has been working with QPM Energy and has contributed to the Project design including identification of appropriate mitigation measures to reduce environmental impacts and maximise beneficial environmental outcomes.

EMM's work has included desktop ecological assessments, flora and fauna survey, input to design to avoid and mitigate impacts, and completed significant impact assessments on prescribed matters. The baseline information collected has been used to support approval processes and to inform ongoing engagement with community members and stakeholders.

This Environmental Offset Strategy has been developed to support the assessment of:

- Preliminary Documentation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Environmental Authority (EA) for a resource activity under the *Environmental Protection Act 1994* (EP Act).

The supporting impact assessments concluded:

- significant residual impact to Matters of National Environmental Significance (MNES) (Ornamental Snake) with offsets required under the EPBC Act framework
- significant residual impacts to Matters of State Environmental Significance (MSES) (endangered regional ecosystem (RE) (RE 11.4.9) and Ornamental Snake habitat) with offsets required under the *Environmental Offsets Act 2014*.

This offset strategy provides sufficient information to enable approvals to be issued and identifies future actions and deliverables to finalise the environmental offsets, including an Offset Area Management Plan (OAMP) prior to Project commencement.

1.1 Purpose of this report

The purpose of this Environmental Offset Strategy is to identify what the environmental offset requirements of the Project are, and how the offsets will be delivered in accordance with applicable environmental offset policies and frameworks.

The scope of this report includes:

- summary of the Project's environmental offset requirements under EPBC Act and EP Act
- describe the applicable offset policies

- determine the offset availability in the study area (200 km buffer around the Project area but within the Brigalow Belt bioregion) for offset values
- confirm the preferred approach to offset delivery and how this meets policy requirements
- summarise preliminary offset areas and conservation outcomes to be achieved
- identify next steps to finalise offset package.

The Department of Climate Change, Energy, Environment and Water (DCCEEW) information requirements pertaining to environmental offsets under EPBC Act as identified in the request for information (RFI) are summarised in Table 1.1 as well as a cross-reference to where they are addressed in this report.

Table 1.1 Information requested by DEECCW

Information requested	Section in Report
The methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to the project site for each relevant MNES, including: • total area of habitat (in hectares) • habitat quality (e.g. using the Queensland Government's Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy (2021a)).	Chapter 6, Section 7.3
Details of the potential offset area/s (including a map) to compensate for the residual impacts of the proposed action on relevant protected matters.	Section 6.2, Section 7.4
Specific details of the nature of the conservation gain to be achieved for relevant protected matters, including the creation, restoration and revegetation of habitat in the proposed offset area/s.	Section 7.5, Chapter 9
Details, with supporting evidence, of how the environmental offset/s meets the requirements of the EPBC Act Environmental Offsets Policy (2012) (Offsets Policy), available at: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.	Chapter 4, Chapter 5, Chapter 8, Section 9.5
The methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to each potential offset area/s for each relevant protected matter, including: • time over which loss is averted (maximum 20 years) • time until ecological benefit • risk of loss (%) without offset • risk of loss (%) with offset • confidence in result (%).	Chapter 6, Section 7.3, Section 7.4
Evidence that the relevant protected matter, and/or their habitat, can be present in the potential offset area/s.	Section 7.5
Information about how the potential offset area/s provides connectivity with other relevant habitats and biodiversity corridors.	Section 7.5

Table 1.1 Information requested by DEECCW

Information requested	Section in Report
Details and execution timing of the mechanism to legally secure the environmental offset/s (under Queensland legislation or equivalent) to provide enduring protection for the potential offset area/s against development incompatible with conservation.	Section 9.6

2 Background

2.1 The applicant

QPM is an Australian company listed on the Australian Securities Exchange (ASX:QPM). The head office is in Brisbane, Queensland and the company also has an office in Townsville, North Queensland. QPM shareholders include global battery manufacturing leader LG Energy Solution and major Korean conglomerate POSCO. QPM has secured binding offtake agreements for the sale of nickel and cobalt with LG Energy Solutions and POSCO.

QPM is presently delivering approvals for the TECH Project which is intended to become the leading supplier of high-grade, ethically derived advanced battery materials. Once operational, the TECH Project will be a carbon negative, sustainable, clean and green production facility that will ultimately position QPM as an attractive supplier of key chemicals to the electric vehicle and energy storage industries.

QPM's Energy Project will support projects such as the TECH Project by utilising waste coal mine gas from the Bowen Basin which would be either flared or directly emitted to the atmosphere as a fugitive emission of methane which has a Global Warming Potential factor of 28 times that of carbon dioxide over a 100 year lifetime and 84 times over the first 20 years. It achieves dual benefits of capturing and consuming gas that would otherwise contribute significantly to Global Warming and manufacturing battery grade minerals to support the ongoing electrification of the automobile industry.

In developing the Project and gas supply business, QPM Energy has been established as a wholly owned but stand alone and independently managed entity.

2.2 Project description

The Project involves the design, construction, and operation of a gas compression facility (GCF) and a high-pressure pipeline that links the proposed GCF to the nearby existing and operational North Queensland Gas Pipeline (NQGP). The high-pressure pipeline is 16.8 km in length.

The Project proposes to collect waste coal mine gas at the proposed GCF via waste gas gathering lines located at adjacent coal mines. At the GCF, waste coal mine gas will be dehydrated and filtered, with the remaining clean gas then compressed and transported via high-pressure pipeline to the existing and operational NQGP. The NQGP will then transport the compressed gas north to Townsville, where it will be depressurised and distributed, by a third party, to industrial users, including QPM's TECH Project.

Access to the GCF will be provided via the construction of a 2.8 km all-weather access road from Red Hill Road.

2.3 Project Location

The Project will be located approximately 43 km north of Moranbah (refer Figure 7.1).

The proposed high-pressure pipeline is situated over two properties (Denham Park and Dabin Station), comprising the following lot/plans – Lot 23 on SP262530, herein named Lot 23, Lot 11 on SP262530, herein named Lot 11 both located on Denham Park, and Lot 2 on SP214117 located on Dabin Station, herein named Lot 2. The pipeline also crosses Lot 100 on SP235905 (Goonyella rail system) which will be underbored with no surface impacts and also crosses underneath the Sunwater Moranbah and Eungella pipelines. The Project footprint or corridor width is 30 m wide.

The Project area also includes a 40 m buffer from the proposed high-pressure pipeline corridor which is 30 m in width (total width surveyed along the alignment is 110 m). This buffer also intersects a small portion of Lot 14 on CP846391 located on Burton Downs, herein named Lot 14, and Lots 23, 11 and 2.

The proposed gas compression facility and access road is located on Lot 2, and is also buffered by 40 m, for the purpose of this ecological assessment.

2.4 Project area and battery limits

The key site components required for the Project are described in Table 2.1.

Table 2.1 Key components

Component	Description
Gas Compression Facility	• Captures and converts waste coal mine gas to clean gas. • Proposed to be located at Dabin Station on the southern boundary of Lot 2 SP214117 and 2.7 km west of the Red Hill Road reserve. • Sited on a 200 m by 300 m area. • 6 ha disturbance footprint.
High-pressure pipeline	• High-pressure pipeline to transport clean gas from the GCF to the NQGP. • 16.8 km in length, running along cleared areas, fence lines and fire breaks along property boundaries. • During construction, a 30 m wide construction right of way (disturbance area of 51 ha). • During operations, a 15 m wide operating easement (disturbance area of 25 ha) from 3.2 km from the GCF.
Access road	• Road to provide all-weather access to the GCF from Red Hill Road reserve. • 2.8 km long and 30 m wide. • 8 ha disturbance footprint.

The Project is defined by limits which include:

- road connection to Red Hill Road
- GCF inlet flange/s to the facility from gas gathering systems on adjacent mining tenures
- connection to the NQGP (via hot tap)
- GCF clean water pipeline flange returning water to the relevant existing mine water management systems
- rainfall run-off from an on-site settling basin
- high-pressure pipeline easements (30 m wide ROW) during construction and reduced to 15 m ROW during operations from 3.2 km from the GCF boundary).

3 Project approvals and biodiversity assessments

3.1 Commonwealth

3.1.1 MNES

Actions that may have a significant impact on MNES are referred to the environment minister and, if they are considered to be a 'controlled action', undergo environmental assessment in accordance with the EPBC Act. At the completion of an assessment, the minister must decide whether to approve the action, and may approve the action subject to conditions. These conditions can include environmental offsets ('offsets').

Offsets are required to be delivered in accordance with the EPBC Act Environmental Offsets Policy (DSEWPC 2012). The Environmental Offsets Policy outlines the Australian Government's approach to the use of offsets under the EPBC Act. Offsets are defined as measures that compensate for the residual adverse impacts of an action on the environment. Where appropriate, offsets are considered during the assessment phase of an environmental impact assessment under the EPBC Act (DSEWPC 2012). Avoidance and mitigation measures are the primary strategies for managing the potential significant impact of a proposed action. Offsets do not reduce the likely impacts of a proposed action, but instead compensate for any significant residual impact.

Where significant residual impacts are found to occur to MNES, and environmental offsets are required, an offsets package should be provided. An offsets package is a suite of actions that a proponent undertakes in order to compensate for the significant residual impacts to the identified MNES. It can comprise a combination of direct offsets and other compensatory measures. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain (DSEWPC 2012).

To support any offset assessments that may be required it will be important to evaluate the specific MNES attributes that occur within the proposed disturbance area (e.g. is it foraging habitat or breeding habitat) and the habitat quality of mapped habitat areas. This information is required to inform offset calculations.

Desktop assessments and comprehensive seasonal ecological surveys of the Project area took place in 2021 and 2022. These were conducted to provide an understanding of the broader environmental values, landscape features, vegetation communities and threatened species that are known or have the potential to occur in both a broader study area and the Project area.

The assessments and surveys undertaken for the Project identified MNES that are considered 'known' or 'likely' to occur within the Project area. Following this, QPM Energy has worked with EMM to identify measures that can be taken to avoid impacts on MNES including alteration of Project design. Significant impact assessments have been completed based on these Project refinements in accordance with the EPBC Act Significant Impact Guidelines 1.1 (DoE 2013) and full details are provided in the MNES Assessment Report (EMM 2022a). A list of MNES that are considered 'known' or 'likely' to occur within the Project area, and whether they are significantly impacted are summarised in Table 3.1 below.

Table 3.1 Summary of MNES assessment

MNES	Habitat description	Total area of habitat impacted in Project area (ha)	Significant residual impact	Offset required (yes/no)
Threatened ecological communities				
Brigalow TEC	The Project area has been surveyed for the Brigalow TEC. Two patches of Brigalow that meet the requisite condition thresholds to qualify as the Brigalow TEC are present within the Project footprint on Lot 2 (Dabin Station). A further three patches of the Brigalow community occur within the Project area, however are too degraded by weed invasion to meet the condition thresholds that define the Brigalow TEC. The two Brigalow TEC patches within the Project footprint both contain advanced regrowth of previously disturbed vegetation. The westernmost patch appears to have been disturbed earlier and is characterised by regrowth Brigalow woodland (7–8 m tall) interspersed with Blackbutt-dominated woodland on red-brown sandy clay soils. This is consistent with Endangered REs 11.4.9/11.4.8, however is mapped as High Value Regrowth of Endangered RE 11.8.13, which is described as semi-evergreen vine thicket and microphyll vine forest on Cainozoic igneous rocks. Exotic grasses are very sparse in the ground layer, comprising ~5% of cover. A section of HVR 11.4.9/11.4.8 (Brigalow 5–6 m tall with emergent, interspersed taller Blackbutt to 16 m) is present immediately east of this patch. Exotic grasses are similarly sparse within the patch, with around 5% cover. This patch is incorrectly mapped as a heterogeneous polygon of 'Of Concern' RE 11.8.11/11.8.5, which are grassland-dominant REs that are not present. The two patches of Brigalow TEC within the Project footprint comprise part of a larger patch of Brigalow with SEVT understorey, which extends to the north of the Project area and will not be impacted. Within the Project area, approximately 0.8 ha of Brigalow TEC occurs within the high-pressure pipeline alignment on Lot 2.	0.8 ha	No	No

Table 3.1 Summary of MNES assessment

MNES	Habitat description	Total area of habitat impacted in Project area (ha)	Significant residual impact	Offset required (yes/no)
Fauna species				
Ornamental Snake	After heavy rain on 10 March 2022, a total of nine individuals were recorded on Lot 23 and on the following night, a total of 30 individuals were recorded in the same area. All individuals were in the gilgai on the eastern part of the property, although it is likely individuals would have been recorded in the western part of the alignment too if this area had been accessed (was not possible due to flooding). In November 2022, five Ornamental Snake were recorded on the southern part of Lot 11 in gilgai habitat, although the species is expected on the whole north-south alignment on this lot. Additionally, the species has potential to occur in parts of Lot 11 and Lot 2 where Brigalow communities on clay soils are present adjacent to areas of gilgai on the east-west alignment north of the Project area. These areas are mapped as potential dispersal habitat. These areas were spotlit in November 2022 although no Ornamental Snakes were recorded in these areas. This connectivity habitat includes Brigalow communities away from areas of gilgai. This is consistent with the Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles (DSEWPC 2011) which includes connective habitat as being important for the species. All areas of gilgai within the Project area have been mapped as preferred habitat for this species, based on the number of records during the March 2022 survey. A total of 36.05 ha of preferred habitat and 19.62 ha of connectivity/dispersal habitat between areas of preferred habitat is mapped in the Project area.	36.05 ha (breeding) 19.62 ha (dispersal/connectivity)	Yes	Yes

Table 3.1 Summary of MNES assessment

MNES	Habitat description	Total area of habitat impacted in Project area (ha)	Significant residual impact	Offset required (yes/no)
Squatter Pigeon	Squatter Pigeon were observed on four different occasions while traversing the Project area in March 2022. This comprised groups of one, two, five and eight individuals all in the same vicinity around the dam on Lot 23. Squatter Pigeon are typically found in remnant or regrowth habitats dominated by Eucalyptus, Corymbia, Acacia or Callitris species within 3 km of available surface water. Breeding habitat is within 1 km of a water source. Permanent or temporary water is available across the Project area in the form of the above named farm dam, as well as other small dams in the vicinity of the Project area. Additionally, mildly disturbed or cleared habitats along vehicle tracks or on the peripheries of the Project area represent ideal habitat for this species. Utilised habitat in these areas have low ground layer cover, typically below 33%. Given that the majority of the Project area is characterised by brigalow regrowth with a dense grassy understorey of Buffel Grass, with limited availability of permanent water, the alignment generally does not provide suitable habitat for Squatter Pigeon. Suitable habitat is associated with the open woodland adjacent to the farm dam and similar habitats away from the alignment. Habitat mapping is based on DCCEEW criteria, but was further refined based on observations made in the field as much of the Project area is considered too weedy and densely vegetated for the species to occur (e.g. areas of dense Buffel Grass) or areas on heavy clay soils (landzone 4). Particularly within areas of Project infrastructure in the centre of the Project area, the habitat is typically unsuitable for the species. Much of the Project area is dominated by areas of dense Buffel Grass groundcover, which differs from the patchy tussock grassy understories of open woodland favoured by the species. Feeding opportunities are restricted in such dense weedy understoreys, and the potential for predation is increased. Therefore, dense Buffel Grass areas have been excluded from mapping. A total of 9.55 ha of breeding habitat, 19.98 ha of foraging habitat and 2.15 ha of dispersal habitat is mapped within the Project area.	9.55 ha (breeding) 19.98 ha (foraging) 2.15 ha (dispersal)	No	No

Table 3.1 Summary of MNES assessment

MNES	Habitat description	Total area of habitat impacted in Project area (ha)	Significant residual impact	Offset required (yes/no)
White-throated Needletail	The species was observed in December 2021 surveys and also observed near the Project area on March 2022 surveys. It is likely to occur sporadically throughout the summer months. No habitat map has been prepared for this species as it is an aerial insectivore that spend most of its time aloft, and could occur anywhere over the Project area, therefore the whole Project area is considered potential foraging habitat. The species does not breed in Australia, and as a wide-ranging nomadic species, foraging habitat also provides a surrogate for dispersal habitat. There is limited potential for roosting habitat in the Project area as there is generally a lack of mature woodland in which the species may roost. It is thought that the number of references to Needletails roosting in trees possibly over-emphasises such occurrences. The Project area contains 7.04 ha of potential roosting habitat and 65.05 ha of potential foraging habitat for White-throated Needletail (inclusive of above potential roosting habitat).	58.01 ha (foraging) 7.04 ha (roosting)	No	No

Table 3.1 Summary of MNES assessment

MNES	Habitat description	Total area of habitat impacted in Project area (ha)	Significant residual impact	Offset required (yes/no)
Koala	This species has not been recorded within the Project area or within the study area. It is generally scarce in the Moranbah region. Conservatively it is considered as having potential to occur on the Project area despite there being no evidence of scratches or scats during field surveys. Habitat mapping is limited to vegetation where food tree species are present. The Project area is largely cleared and dominated by dense weedy ground-cover. If present, the species is likely to be restricted to areas where sparse *Eucalyptus cambageana* or *Eucalyptus orgadophila* are present, or the patch of RE 11.5.3/11.5.15 on Lot 11. The remainder of the Project area is largely cleared and dominated by regrowth Acacia. These areas were subject to intensive spotlighting in November 2022 and the species was not recorded. For the purposes of this assessment, all Koala habitat is combined and assessed. However, the different quality of Koala habitats throughout the Project area have informed Project design and layout with higher quality areas prioritised for avoidance or minimisation of infrastructure. Approximately 5.0 ha of low quality potential habitat is mapped within the Project footprint.	5.0 ha (Potential)	No	No
Fork-tailed Swift	Multiple records of this species are represented within the study area and habitat is present within the Project area. During surveys this species was identified adjacent to the Project area over Burton Dam; approximately 18 km to the east therefore, it is considered as likely to occur. No habitat map has been prepared for this species as it is an aerial insectivore that spends most of its time aloft, and could occur anywhere over the Project area, therefore the whole Project area is considered potential foraging habitat. The species does not breed in Australia, and as a wide-ranging nomadic species, foraging habitat also provides a surrogate for dispersal habitat.	65.05 ha (foraging)	No	No
Latham's Snipe	No records of this species exist within the study area although areas of potentially suitable habitat in the form gilgai occur within the Project area. Such habitats may be utilised on a sporadic basis if the species is present in the region. A total of 36.05 ha of potential habitat is mapped within the Project area.	36.05 ha (foraging)	No	No

3.2 Queensland

3.2.1 MSES

As part of the assessment process for an EA under the EP Act, the presence of MSES within the proposed impact area was required to be identified and impacts quantified. If a significant residual impact is considered likely to occur to MSES, environmental offsets will be conditioned through the EA approval in accordance with the *Environmental Offsets Act 2014* (EO Act). These State assessments do not come under the bilateral agreement and therefore will be assessed and approved separately to the EPBC Act. These assessments were completed in 2022 (EMM 2022b).

A summary of the results for the MSES significant impact assessment are in Table 3.2.

Table 3.2 Summary of MSES assessment

MSES under SRI guideline	Relevance and assessment	Significant residual impact?	Offset required?
Regulated vegetation	**Relevant** **Endangered Res** Endangered REs are present in the footprint. Patches of RE 11.4.9 were ground-truthed along the pipeline on Lot 2 and Lot 23 totalling 3.04 ha of remnant vegetation. The Project will have a SRI under this criterion as the clearing of RE 11.4.9 is greater than 20 m wide in a number of patches. The clearing will be greater than 20 m wide in all three patches intersected by the alignment. Under the MNES assessment, only one of the three patches mapped met the criteria for Brigalow TEC, due to the weedy nature of the understory dominated by Buffel Grass. Disturbance of the patch meeting TEC status would be limited to approximately 0.8 ha of a more extensive, 60 ha patch. Weed hygiene protocols will be put in place to minimise the risk of project activities facilitating the spread of weeds and weed management will occur to ensure weeds do not encroach into the remaining patch of Brigalow. Erosion and sediment control measures will also ensure that the integrity of abiotic factors in retained Brigalow is maintained. No SRI to Brigalow TEC was predicted in the MNES assessment.	Yes	Yes
	Relevant but no SRI **Watercourse vegetation** RE 11.8.5 was ground-truthed along the pipeline in the vicinity of Goonyella Creek. Based on the alignment, the project footprint will avoid this patch of vegetation within the defined bank of the watercourse. Therefore, this Project will not have a SRI on watercourse vegetation.	No	No

Table 3.2 Summary of MSES assessment

MSES under SRI guideline	Relevance and assessment	Significant residual impact?	Offset required?
Connectivity areas	**Relevant** The SRI assessment is based on consideration of both certified RE mapping in the Project footprint as well as ground-truthed RE mapping. The total estimated area of vegetation clearing is 8.04 ha of remnant vegetation, 0.37 ha of mapped high-value regrowth vegetation and 56.64 ha of non-remnant areas. Native vegetation along riparian corridors is being maintained. Therefore, connectivity is being maintained through the site. The SRI assessment also used the Landscape Fragmentation and Connectivity (LFC) Tool version 1.4, which performs a desktop assessment of development impacts on connectivity areas containing remnant vegetation. Where impacts cannot be avoided, mitigation and management measures will be implemented to reduce residual impacts to the lowest extent practicable. The LFC Tool concluded that the Project will not result in a significant residual impact on connectivity.	No	No
Wetlands and watercourses	**Not relevant – no referable wetlands, wetlands of HES or watercourses of HES.**	N/A	N/A
Protected wildlife habitat	**Relevant** Assessment of the impact on protected wildlife habitat is based upon ground truthed areas of habitat mapped by EMM following ecological survey in December 2021, March 2022, and June 2022. As the species assessed are all listed under the EPBC Act (with the exception of Short-beaked Echidna – SLC under the NC Act), if a SRI is found to occur under the EPBC Act, the species will be offset under the EPBC Act. This is in accordance with the hierarchy specified under the QEOP. The significance assessment under the EP Act concluded a significant impact to Ornamental Snake habitat. It should be noted that a significant impact to Ornamental Snake habitat was concluded under the separate MNES assessment (EMM 2022a) therefore under the hierarchy of impacts, offsets for that species will be prepared under the EPBC Act framework.	N/A	N/A
Koala habitat in south east Queensland	**Not relevant – the Project is not within South East Queensland.**	N/A	N/A
Protected areas	**Not relevant – no protected areas in the footprint.**	N/A	N/A
Fish habitat areas and highly protected zones of state marine parks	**Not relevant – no declared fish habitat areas in the footprint.**	N/A	N/A
Waterway providing for fish passage	**Relevant** There is only one watercourse crossing proposed and these will be temporary. Detailed design has not been completed. Works will occur when watercourses are dry to avoid impacting on fish passage and water quality. Appropriate mitigation measures will be put in place to avoid any spills or contamination into watercourses that may result in mortality of fish and aquatic ecosystems. These measures will be outlined in a CEMP. Hydrology conditions including bed and banks of the watercourse will be maintained. No significant residual impact to fish passage is likely.	No	No
Marine plants	**Not relevant – no marine plants in the footprint.**	N/A	N/A

Table 3.2 Summary of MSES assessment

MSES under SRI guideline	Relevance and assessment	Significant residual impact?	Offset required?
Legally secured offset areas	**Not relevant – no legally secured offset areas in the footprint.**	N/A	N/A

4 Offset Policy Framework

4.1 EPBC Act offset policy

Offsets for significant impacts to MNES are required to be assessed and delivered in accordance with the EPBC Act Environmental Offsets Policy (DSEWPC 2012).

The Offsets Assessment Guide, which accompanies this policy, has been developed in order to give effect to the requirements of this policy, utilising a balance sheet approach to measure impacts and offsets. It applies where the impacted protected matter is a threatened species or ecological community. Significant impact assessments for MNES have been prepared and full details are provided in the QPM Energy MNES Assessment Report. Those MNES found to have a significant impact and require offsets are summarised in Chapter 5 of this report.

The EPBC Act Environmental Offsets Policy will take precedence in the assessment and delivery of environmental offsets for Queensland projects under an established hierarchy. Where a MSES value is the same or substantially the same as a MNES the offset will be delivered under EPBC Act. The hierarchy is specified under the Queensland EO Act to avoid duplication of offset conditions between Commonwealth, State and Local Governments.

The DCCEEW require that an offset proposal is provided during the decision-making stage which is considered in deciding whether the proposed action should be approved. There are two key types of information utilised in planning an offset proposal – determining what types of activities would be appropriate as offsets for a given impact and determining the specific size and scope of an offsets package. Matters to be assessed include specific attributes of the protected matter at the impact site including quality of habitat, duration of the impact and matters at the offset site such as conservation gain to be achieved, land tenure, time to achieve conservation gain and suitability of the location of the offset site (DSEWPC 2012).

The offset proposal is one of many considerations that are weighed at the decision stage in determining the overall acceptability of the proposed action, including economic and social matters. Offset requirements can be included as a condition of approval as provided for under Section 134 of the EPBC Act.

4.1.1 EPBC Act offset delivery options

The EPBC Act Environmental Offsets Policy requires offsets are built around direct, land-based offsets that protect and enhance threatened ecological communities and species habitats that were impacted. At least 90% of a total offset requirement should deliver a conservation gain to the impacted MNES (i.e. like for like) through direct measures that are additional to what is already required, including improving condition of existing habitat and reducing threats or creating new habitat. The remaining 10% of an offset obligation can be indirect or supplementary measures that also relate to the impacted MNES such as research or threat abatement.

Deviation from the minimum of 90% direct offset requirement will only be considered where:

- It can be demonstrated that a greater benefit to the protected matter is likely to be achieved through increasing the proportion of other compensatory measures in an offsets package.
- Scientific uncertainty is so high that it isn't possible to determine a direct offset that is likely to benefit the protected matter. For example, this can be the case in some poorly understood ecosystems in the Commonwealth marine environment (DSEWPC 2012).

A land-based offset needs to be legally secured on title in perpetuity and actively managed to improve ecological condition and provide a conservation gain for the impacted matter. A conservation gain may be achieved by:

- improving existing habitat for the protected matter
- creating new habitat for the protected matter

- reducing threats to the protected matter
- increasing the values of a heritage place
- averting the loss of a protected matter or its habitat that is under threat.

The offset must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced. Offsets should align with conservation priorities for the impacted protected matter and be tailored specifically to the attribute of the protected matter that is impacted in order to deliver a conservation gain. For instance, if the proposed action is likely to have impacts on foraging habitat for a particular protected matter, then the offset should create, improve, protect and/or manage foraging habitat.

Offsets that deliver social, economic and/or environmental co-benefits are encouraged.

4.2 Queensland Environmental Offsets policy

For a prescribed activity an environmental offset may be required as a condition of approval where, following consideration of avoidance and mitigation measures, the activity is likely to result in a significant, residual impact on a prescribed environmental matter(s). For the Project, applicable prescribed environmental matters to be assessed are Endangered RE 11.4.9.

State offset requirements must be delivered in accordance with the Queensland environmental offsets framework. The framework consists of:

- *Environmental Offsets Act 2014*
- Environmental Offsets Regulation 2014
- Queensland Environmental Offsets Policy (QEOP) (Version 1.10) (DES 2021a).

All Queensland offsets must meet the following seven offset principles:

1. Offsets will not replace or undermine existing environmental standards or regulatory requirements or be used to allow development in areas otherwise prohibited through legislation or policy.
2. Impacts must first be avoided, then mitigated, before considering the use of offsets for any remaining impact.
3. Offsets must achieve a conservation outcome that counterbalances the significant residual impact for which the offset was required.
4. Offsets must provide environmental values as similar as possible to those being lost.
5. Offset provision must minimise the time-lag between the impact and delivery of the offset.
6. Offsets must provide additional protection to environmental values at risk, or additional management actions to improve environmental values.
7. Where legal security is required, offsets must be legally secured for the duration of the impact on the prescribed environmental matter.

4.2.1 State offset delivery options

Under the QEOP offset requirements can be satisfied through one or a combination of options which include:

- proponent driven offset (primarily land-based and/or delivery of actions in a Direct Benefit Management Plan (DBMP))
- financial settlement offset, or
- a combination of the above.

i Financial Settlement

A financial settlement payment can be used to meet an offset requirement for any MSES impacted by a development. The required payment is calculated by applying the Financial Settlement Offset Calculation Methodology set out in the QEOP, or the on-line calculator can also be used to confirm the MSES payment. Financial payments are made up of costs associated with on-ground land management, administration and landholder incentive payment.

Unless agreement has been reached that the impact and offset will be staged, the full amount of the financial settlement offset must be paid to the offset account administered by Department of Environment and Science (DES) prior to commencing the activity to which the offset condition relates.

The intent is that financial payments are made prior to an impact occurring.

ii Proponent-driven offsets

Proponent driven offsets are primarily land based offsets. The offset is to achieve an equivalent environmental outcome. It must be of a size and scale proportionate to the significant, residual impact on MSES. The size of a land based offset can be determined through use of the Land-based Offsets Multiplier Calculator or using a rapid assessment which caps the offset at a ratio of 1:4. The policy specifies land based offsets should make up 90% or more of the total offset requirement, unless otherwise agreed.

Land based offsets are to provide environmental values as similar as possible to those being lost and may consist of remnant or non-remnant vegetation. Where remnant vegetation is used management actions are required to demonstrate additional outcomes and enhance the environmental value. For example, Endangered and Of Concern REs, offsets must be of the same Broad Vegetation Group (BVG) as the impacted RE, of the same RE status, and within the same bioregion. For flora and fauna species the offset must contain, or be capable of containing, a self-sustaining population of that same impacted species.

The offset site is preferably located in a strategic offset investment corridor closest to the impacted site, and risks of a conservation outcome not being achieved are identified and mitigated.

iii Direct benefit management plan

Proponent-driven offsets can also be delivered through priority actions identified in a direct benefit management plan (DBMP) on land.

DBMP priority actions are implemented through the management intent and offset actions in an offset delivery plan. A DBMP is a pre-approved plan that outlines priority actions for addressing threats to, and providing substantial benefits for, a particular prescribed environmental matter. A DBMP may include direct actions as well as indirect actions such as research and education programs. A DBMP endorses actions and an approved methodology for achieving a conservation outcome. Where research and/or education programs are proposed to be delivered as part of a DBMP offset, they will only be accepted as no greater than 10% of the offset, unless otherwise agreed; for example, in circumstances where it can be demonstrated that the level of investment in research and education will deliver a greater overall conservation outcome for the prescribed environmental matter than investment in other actions that could benefit that matter.

Actions identified in DBMPs must be pre-approved as priority action:

- where the matter is an accredited MNES or MSES – by DES
- where the matter is a MLES - by the relevant local government.

iv Offset Delivery Plan

When choosing to deliver a proponent-driven offset, a notice of election must include a proposed offset delivery plan. The offset delivery plan must:

- Describe how an offset will be undertaken and how the conservation outcome will be achieved, including how the plan will:
  - effectively account for and manage the risks of the offset failing to achieve the conservation outcome
  - ensure the offset provides benefits in relation to the prescribed environmental matter in addition to any other benefit provided under a requirement of, or an authority under an Act
  - have transparent governance arrangements, including being able to be readily measured, monitored, audited, and enforced
  - ensure the offset is of a size and scale proportionate to the significant residual impacts on the prescribed environmental matter.
- State that the proponent, and any other entity that owns land on which the offset will be undertaken, agrees to the offset being undertaken.
- Be signed by the proponent, and any other entity that owns land on which the offset will be undertaken.
- Describe the prescribed environmental matter to which the offset condition relates.
- State whether the offset condition will be delivered wholly or partly on the land on which the offset will be undertaken.
- Include particulars of, or a description sufficient to identify, the land on which the offset will be undertaken.
- Identify and contain details of any person with an interest in the land on which the offset will be undertaken.
- Describe the existing land use of the land on which the offset will be undertaken and any impact that land use may have on the delivery of the offset.

- The measures the proponent will take to secure the land on which the offset will be undertaken as a legally secured offset area.
- State why the proponent considers the stated measures are reasonable and practicable.
- The period during which the measures will occur.
- Why the stated period is reasonable for the purpose of securing the offset.

5 Project offset requirements

5.1 Project environmental offset requirements

The following table summarises offset requirements for the Project based on outcomes of significant residual impact assessments.

5.1.1 MNES offset requirements

The quantum of offset area required for Ornamental Snake has been estimated based on completing a preliminary EPBC offset calculator. The offset calculator is provided in Appendix A, and justification for inputs summarised in Section 7.3.

Table 5.1 summaries the impact areas to be offset for MNES.

Table 5.1 MNES offset requirements

MNES	Area of impact (ha)	Preliminary estimate of offset area required (ha)
Ornamental Snake	A total of 36.05 ha of preferred habitat and 19.62 ha of connectivity/dispersal habitat between areas of preferred habitat is mapped in the Project area.	See Section 7.4 – 227 ha

5.1.2 MSES offset requirements

In terms of assessing the extent of offset area required, as per the General guide for the Queensland Environmental Offsets Framework (DES 2021b), land-based offsets 'have a maximum requirement of four times the area of impact on each MSES (i.e. the maximum offset ratio for a matter is up to 1:4) for matters of State and local significance environmental significance, other than a protected area and connectivity area'. Therefore the 1:4 ratio has been applied to estimate total offset area needed.

Table 5.2 summaries the impact areas to be offset for MSES.

Table 5.2 MNES offset requirements

MSES	Area of impact (ha)	Preliminary estimate of offset area required (ha)
Endangered RE 11.4.9	3.04	12.16

5.1.3 Offset liability

QPM Energy has performed an assessment of offset availability (see Section 6.2). QPM Energy has undertaken a process of identification of potential offset sites based on desktop analysis within a chosen study area.

The offset analysis of potential offset properties (see Section 7.5) has included identification of RE's and habitat that are known or likely to provide suitable habitat for Ornamental Snake.

Priority offset properties were then selected through a process of ranking those which displayed collective characteristics such as largest patch sizes of selected habitats, connectivity to existing protected areas and biodiversity corridors, proximity to records and availability of remnant, HVR and unmapped regrowth. This is discussed further in Section 7.5.

6 Offset availability

6.1 Methodology

Habitat requirements for MNES species is based on EMM's site assessments during baseline surveys, spatial datasets, and best available information about a species' habitat requirements. Vegetation community mapping combined with required habitat features and other environmental attributes (such as distance to permanent water or land zones (LZs)) has been applied to model potential habitats. Relevant habitat suitability information was also used where available such as DCCEEW's Species Profile and Threats Database (SPRAT) profiles, Recovery Plans and Conservation Advice statements, as well as records from the surrounding region.

The habitat modelling is conservative. Certain habitat types and likely distributions across a broader study area can be extrapolated from aerial imagery and using REs which are likely to support suitable habitat.

It should be noted that although habitat is mapped throughout the Project area based on ground-truthed information, habitat mapping in the broader study area is primarily based on broader State certified RE mapping. Therefore, assessment of microhabitat features in potential offset sites is not possible at a desktop level and would require ground truthing.

Additionally, for MSES values (endangered REs) an assessment has been made based on Queensland Government desktop mapping.

6.2 Summary of criteria used for analysis of potential offset areas

The following criteria was used for the desktop analysis of potential offset areas.

The study area for offsets was defined as follows:

- The Project footprint was buffered by 200 km to allow for potentially suitable habitat for the Ornamental Snake to be incorporated.
- Any areas outside of the Brigalow Belt bioregion were then removed.

The study area is illustrated in Figure 7.1.

Within the study area then unsuitable areas were removed by implemented the following filters:

- Protected areas (national park, conservation park, state forest, nature refuge) were removed.
- Areas of resource tenure such as mining leases (ML) and mineral development licences (MDL) were removed.
- Urban areas (e.g. town areas/small lots with dwellings) were removed.

Ornamental Snake potential habitat was mapped using the following desktop criteria:

- Using certified RE mapping remnant and high-value regrowth (HVR) polygons for the following REs were mapped: 11.3.3, 11.4.3, 11.4.6, 11.4.8, 11.4.9, 11.5.16.
- Using pre-clear mapping, areas of the following REs were mapped: 11.3.3, 11.4.3, 11.4.6, 11.4.8, 11.4.9, 11.5.16m (i.e. the above remnant/HVR areas but where vegetation has since been removed). The landzone is favourable and Ornamental Snake occurs frequently in non-remnant areas.
- Palustrine wetlands from Queensland government mapping were included.
- Areas of land zone 4 were mapped as potential gilgai areas.

- Ornamental Snake Wildnet and Atlas of Living Australia (ALA) records were mapped and buffered by 100 m to assist in identifying suitable areas.
- Patches of habitat less than 50 ha in size were removed so areas with good contiguity were favoured.

Potential Brigalow communities were mapped using the following desktop criteria:

- Using certified RE mapping remnant and high-value regrowth (HVR) polygons for the following REs were mapped: 11.3.1, 11.4.3, 11.4.7, 11.4.8, 11.4.10, 11.5.16, 11.9.1, 11.9.5, 11.9.6, 11.11.4, 11.12.21.
- Any patches less than 5 ha in size were then excluded.

Once the analyses above was completed, this then demonstrated the availability of habitat to fulfil QPM Energy's offset requirements within the study area. Following this, a number of properties were then selected (based on their large size with over 250 ha of Ornamental Snake habitat available on the lot/plan to fulfil the likely offset liability). Further, selected properties have been identified based on the proximity of records, and proximity to protected areas to provide connectivity.

These properties will be the priority for further investigation including landowner liaison to determine whether they are willing to have offsets located on their land.

This initial review exercise also included a review of the Queensland offset register for advanced offsets. Although nothing was suitable on this register (properties not large enough and nothing available in the required region), a review of the DES Expression of Interest register was also undertaken. Seven properties were listed in the Isaac region, and one of these properties listed Ornamental Snake as a "threatened native animal species" for the property. This property is discussed in Section 7.5, as one of the properties to be further investigated.

6.3 Values to be offset

6.3.1 Ornamental Snake

i Distribution within the Project area

After heavy rain on 10 March 2022, a total of nine individuals were recorded on Lot 23 and on the following night, a total of 30 individuals were recorded in the same area. All individuals were in the gilgai on the eastern part of the property, although it is likely individuals would have been recorded in the western part of the alignment too if this area had been accessed (was not possible due to flooding).

In November 2022, five Ornamental Snake were recorded on the southern part of Lot 11 in gilgai habitat, although the species is expected on the whole north-south alignment on this lot.

Additionally, the species has potential to occur in parts of Lot 11 and Lot 2 where Brigalow communities on clay soils are present adjacent to areas of gilgai on the east-west alignment north of the Project area. These areas are mapped as potential dispersal habitat. These areas were spotlit in November 2022 although no Ornamental Snakes were recorded in these areas. This connectivity habitat includes Brigalow communities away from areas of gilgai. This is consistent with the Draft Referral Guidelines for the Nationally Listed Brigalow Belt Reptiles (DSEWPC 2011) which includes connective habitat as being important for the species.

All areas of gilgai within the Project area have been mapped as preferred habitat for this species, based on the number of records during the March 2022 survey.

ii Potential habitat within the study area

Within the study area as described in Section 6.2, there is an estimated 219,157 ha of potential Ornamental Snake habitat mapped based on the desktop criteria (which includes filtering based on tenure and patch size (see Section 6.2). Therefore, it is anticipated that there will be abundant habitat available as an offset for this species within the study area.

6.3.2 Endangered Res (RE 11.4.9)

i Distribution within the Project area

Seven mapped polygons of remnant or regrowth REs that are included in the Brigalow TEC description (RE 11.4.8 and 11.4.9), are mapped within the Project area. Five of these occur on Lot 411, which are now excluded from the Project area. One patch of HVR RE 11.4.9 occurs on the original high-pressure pipeline on Lot 23, which has also now been superseded. One patch of remnant RE 11.4.8/11.4.9 occurs on Lot 23, within the current high-pressure pipeline alignment. On Lot 2, several patches of Brigalow community are present that are not mapped correctly in the RE mapping.

Regrowth vegetation qualifies as the Brigalow TEC, provided it meets the condition thresholds listed above. One of the five patches on Lot 411 qualify as the Brigalow TEC, as the cover of Buffel Grass is less than 50%; within the extent of the Project (buffer only, not the high-pressure pipeline), the other four patches are too degraded through Buffel Grass invasion to meet the TEC definition. However, this area has now been superseded by the revised high-pressure pipeline alignment and will not be impacted.

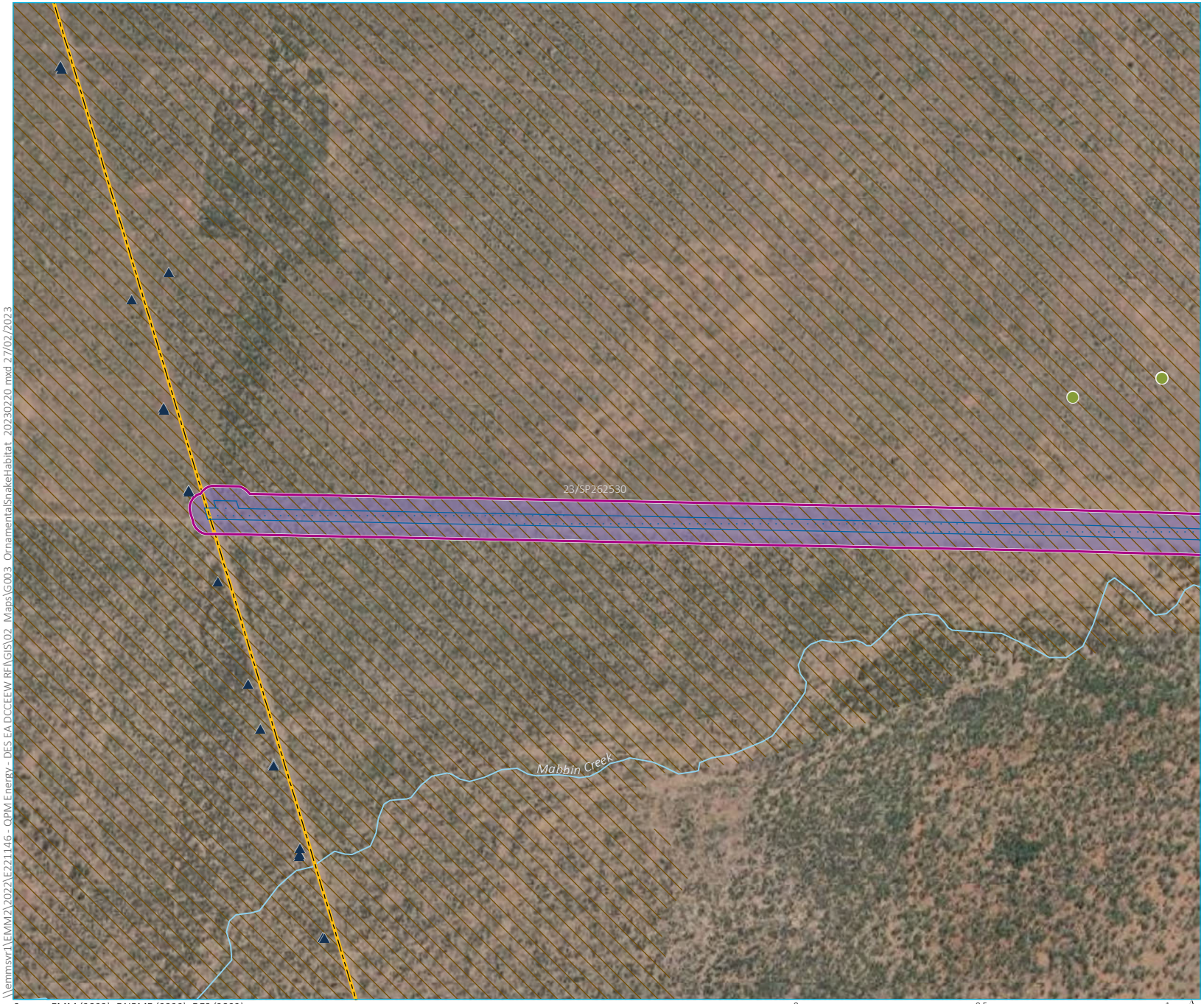
The Brigalow patch on Lot 23 in the superseded alignment meets the definition of the Brigalow TEC, as Brigalow is dominant in the canopy, the vegetation is consistent with regrowth of an analogous RE (11.4.9), the patch is approximately 2.36 ha in size, and exotic perennial cover is around 35%. Further, the historical aerial imagery indicates that the patch has not been cleared since at least 2000 (possibly earlier), so also meets the disturbance criterion (not comprehensively cleared for at least 15 years). However, the Brigalow patch on Lot 23 through which the revised alignment passes is heavily invaded by Buffel Grass and other exotic species, with an average cover assessed over the entire patch (approximately 5 ha) of between 60–100%. Therefore, this patch does not need the condition threshold to qualify as the Brigalow TEC.

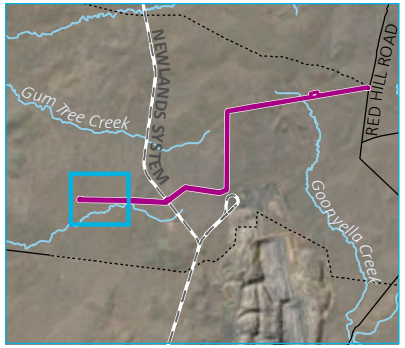
On Lot 2, ground-truthing of vegetation identified errors in the certified Regional Ecosystem mapping. Whilst no Brigalow REs are mapped, remnant and high value regrowth of RE 11.4.9/11.4.8, which is analogous to the Brigalow TEC is present.

ii Potential habitat within the study area

Within the study area as described in Section 6.2, there is 91,580 ha of mapped Brigalow REs based on government mapping.

Therefore, it is anticipated that there will be abundant areas of mapped Brigalow available as an offset for this community within the study area.





KEY

- Project area
- Proposed disturbance footprint
- North Queensland Gas Pipeline
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Preclear land zone 4
- Frog sighting (EMM)

Ornamental Snake records

- EMM
- Wildnet

Ornamental Snake habitat

- Preferred

\\emmsvr1\EMM2\2022\E221146 - QPM Energy - DES EA DCCEEW RFI\GIS\02 Maps\G003 OrnamentalSnakeHabitat 20230220.mxd 27/02/2023

Source: EMM (2023); DNRME (2022); DES (2022)

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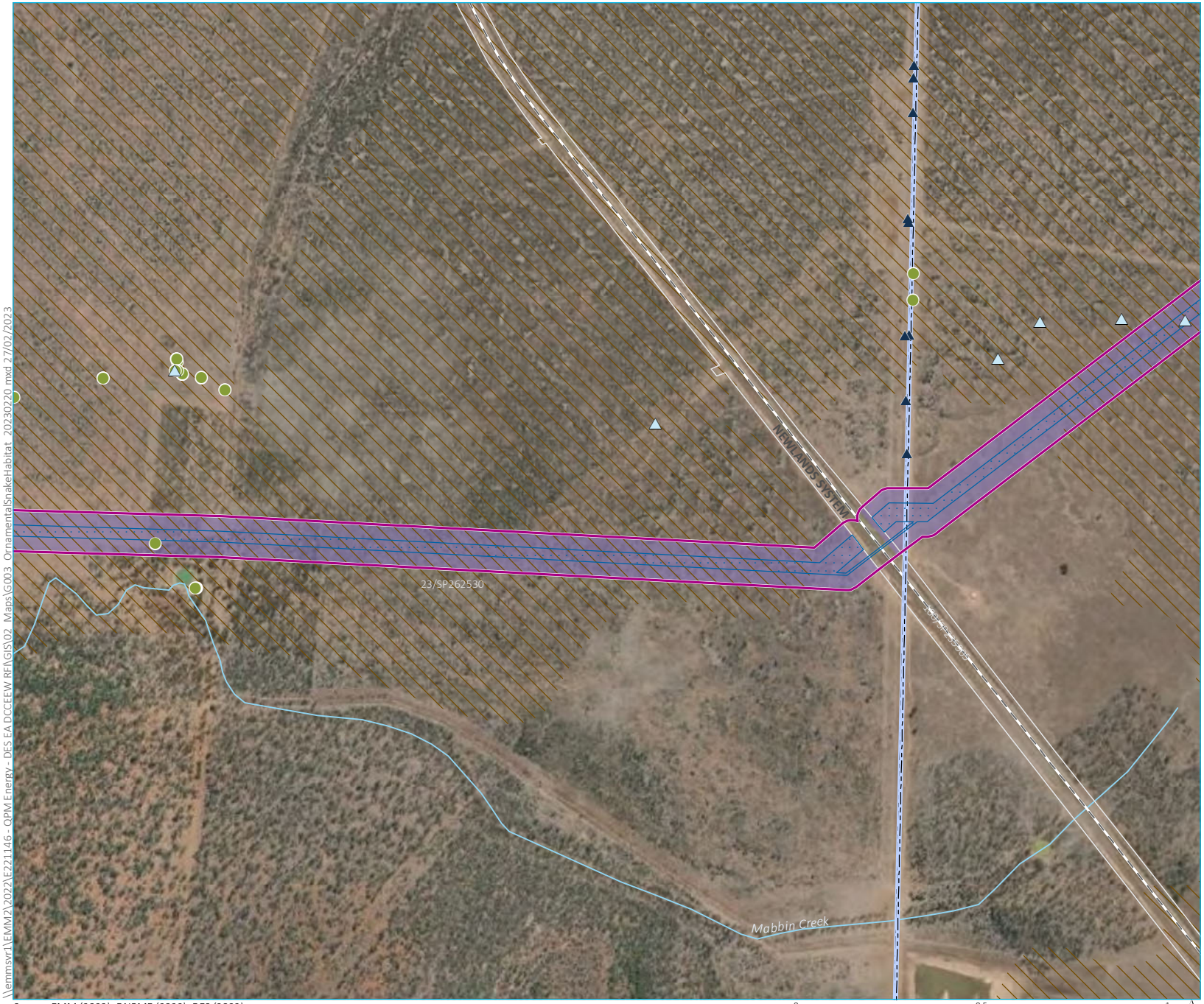
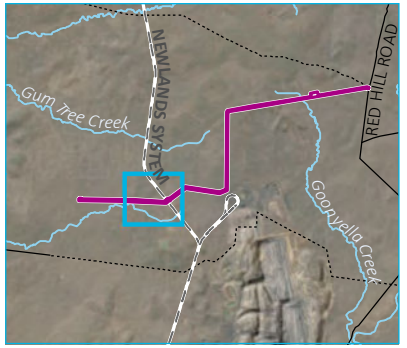
Ornamental Snake habitat records within the project area
Map 1 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.1

EMM creating opportunities





KEY

- Project area
- Proposed disturbance footprint
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Preclear land zone 4
- Frog sighting (EMM)

Ornamental Snake records

- EMM
- Wildnet

Ornamental Snake habitat

- Preferred

Source: EMM (2023); DNRME (2022); DES (2022)

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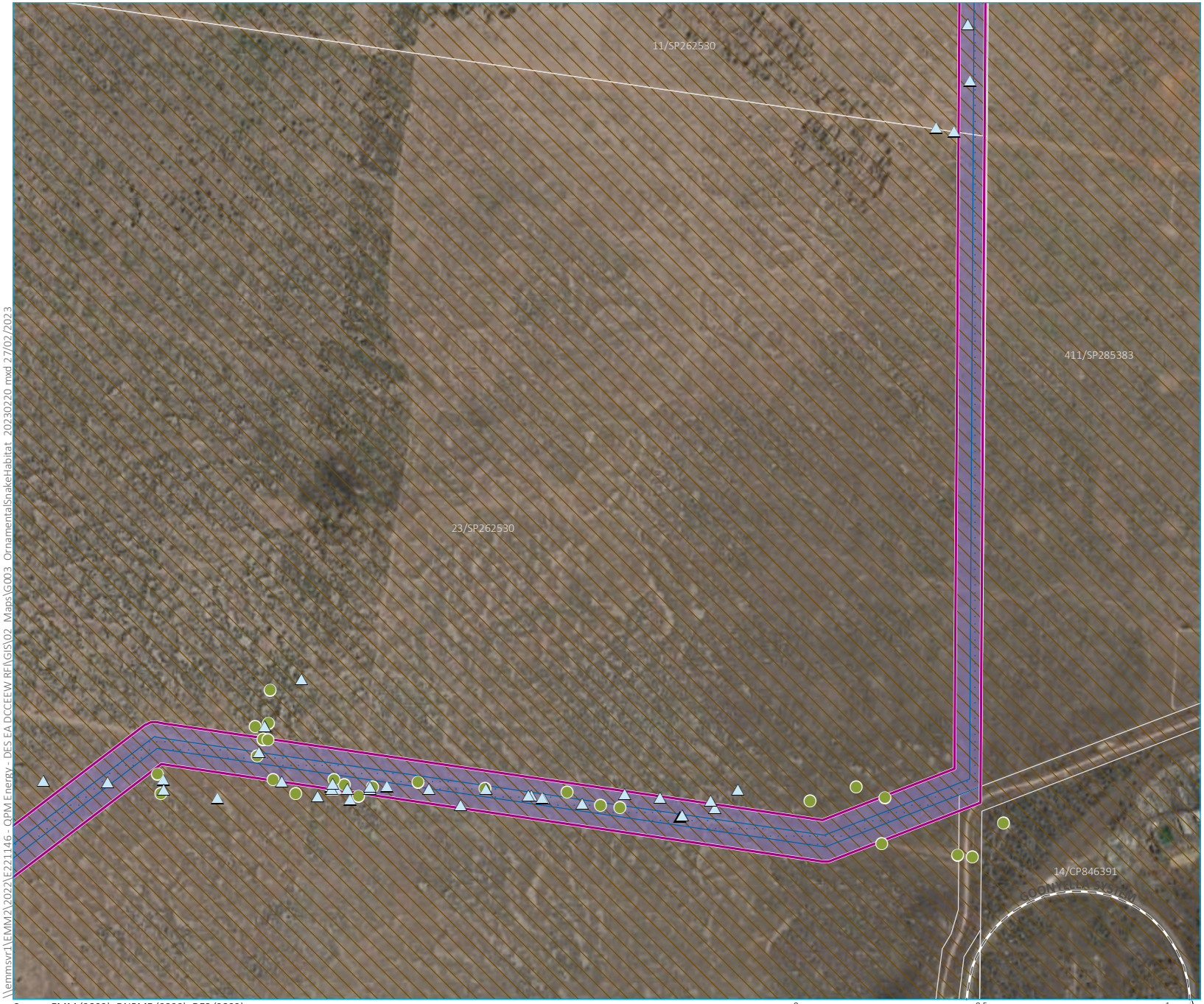
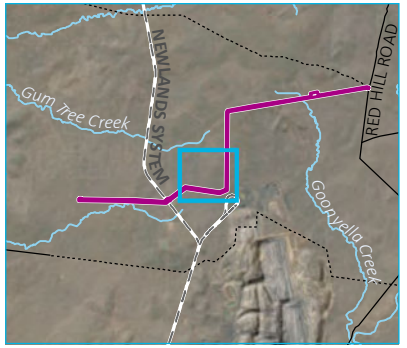
Ornamental Snake habitat records within the project area
Map 2 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.1

EMM
creating opportunities





KEY

- Project area
- Proposed disturbance footprint
- Rail line
- Minor road
- Vehicular track
- Cadastral boundary
- Preclear land zone 4
- Frog sighting (EMM)

Ornamental Snake records

- EMM
- Wildnet

Ornamental Snake habitat

- Preferred

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Source: EMM (2023); DNRME (2022); DES (2022)

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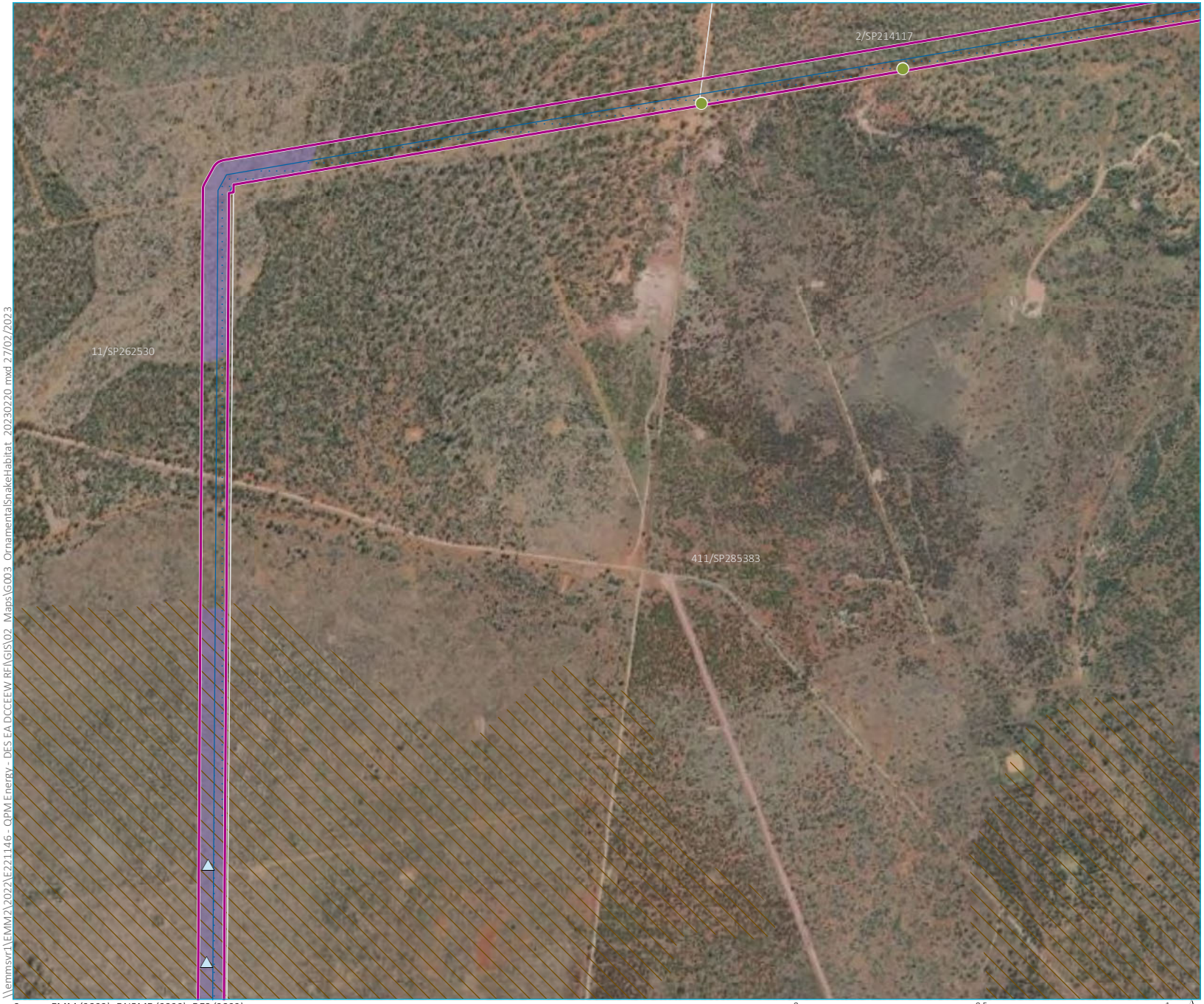
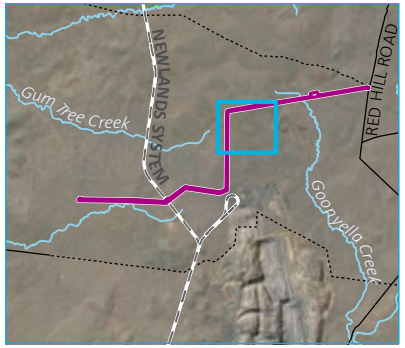
Ornamental Snake habitat records within the project area
Map 3 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.1

EMM creating opportunities





KEY

- Project area
- Proposed disturbance footprint
- Rail line
- Minor road
- Vehicular track
- Cadastral boundary
- Preclear land zone 4
- Frog sighting (EMM)

Ornamental Snake records

- EMM
- Wildnet

Ornamental Snake habitat

- Preferred
- Connectivity

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Source: EMM (2023); DNRME (2022); DES (2022)

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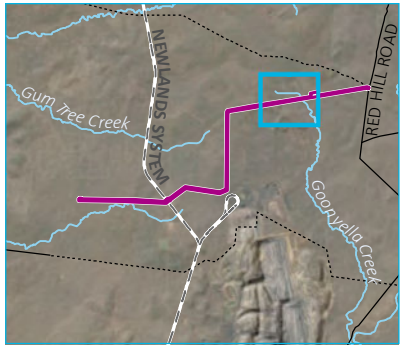
Ornamental Snake habitat records within the project area
Map 4 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.1

EMM creating opportunities



KEY

- Project area
- Proposed disturbance footprint
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Preclear land zone 4
- Frog sighting (EMM)

Ornamental Snake records

- EMM
- Wildnet

Ornamental Snake habitat

- Connectivity

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Source: EMM (2023); DNRME (2022); DES (2022)

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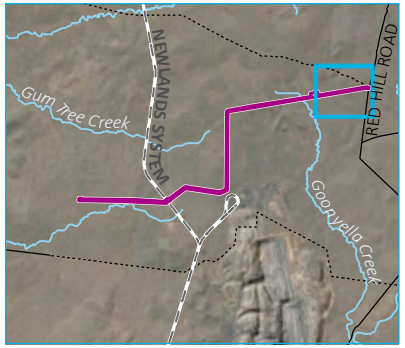
Ornamental Snake habitat records within the project area
Map 5 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.1

EMM creating opportunities



KEY

- Project area
- Proposed disturbance footprint
- Electrical transmission line
- Water pipeline
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary
- Preclear land zone 4
- Frog sighting (EMM)

Ornamental Snake records

- EMM
- Wildnet

Ornamental Snake habitat

- Connectivity

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Source: EMM (2023); DNRME (2022); DES (2022)

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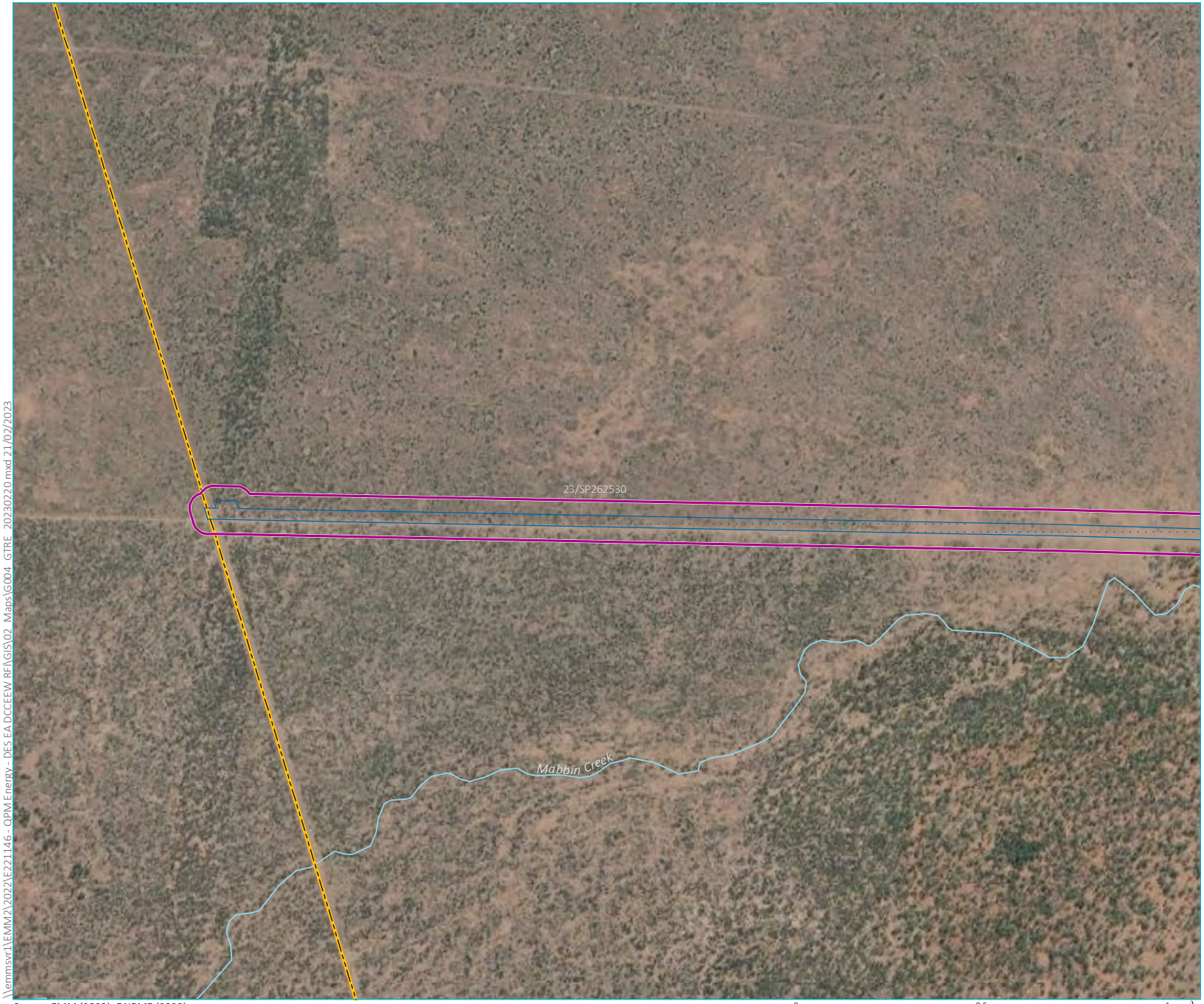
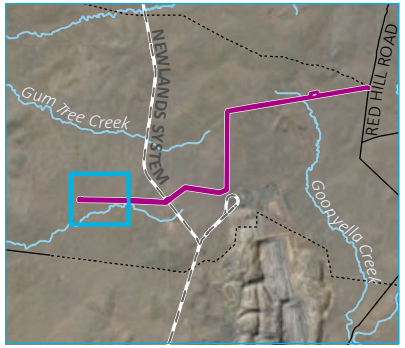
Ornamental Snake habitat records within the project area
Map 6 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.1

EMM creating opportunities





KEY

- Project area
- Proposed disturbance footprint
- North Queensland Gas Pipeline
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary

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Source: EMM (2023); DNRME (2022)

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GDA 1994 MGA Zone 55

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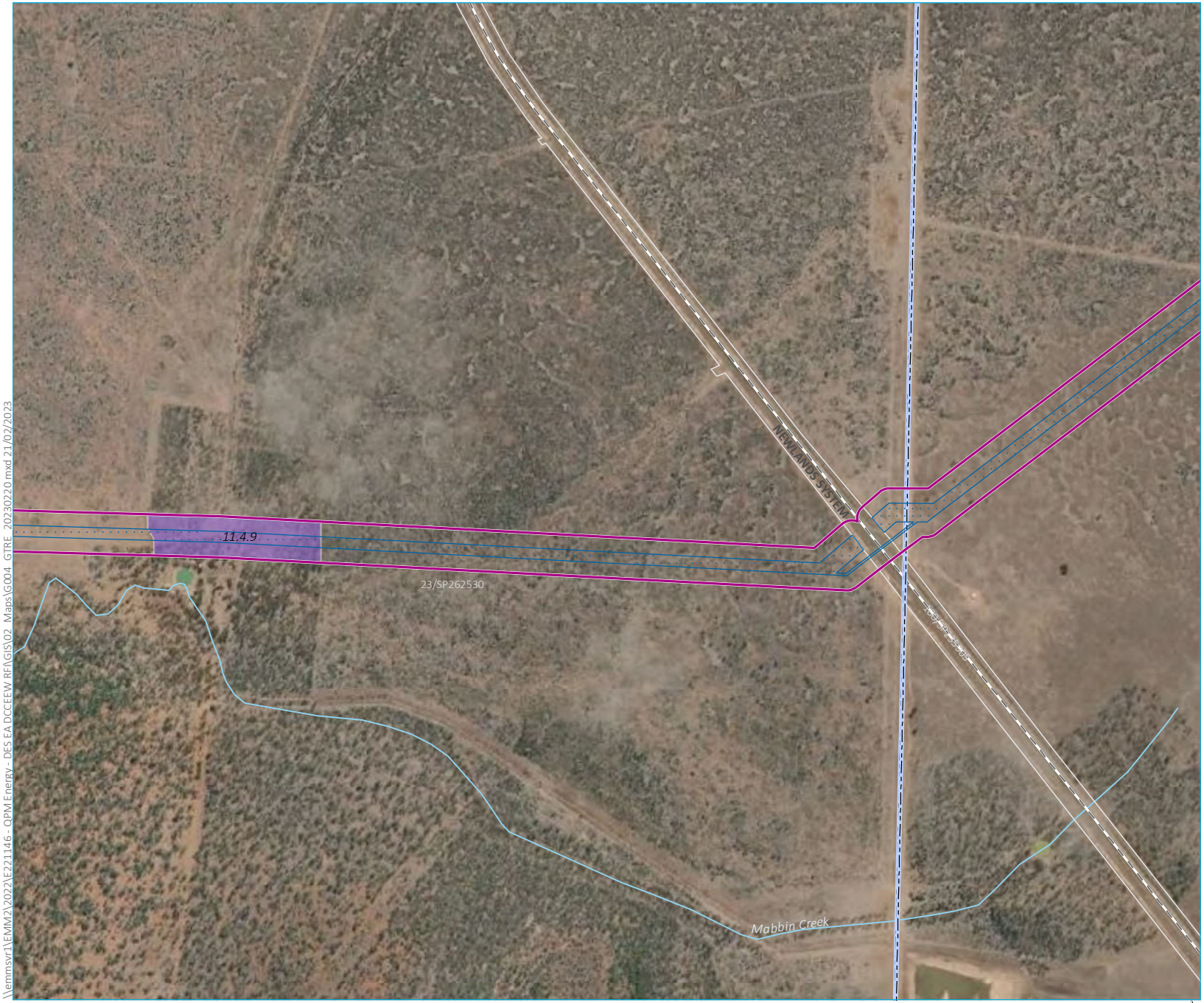
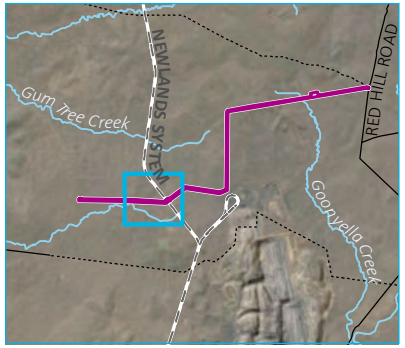
Endangered RE 11.4.9 within the Project area
Map 1 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.2

EMM creating opportunities





KEY

- Project area
- Proposed disturbance footprint
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary

Ground-truthed regional ecosystems

- Remnant - endangered

Source: EMM (2023); DNRME (2022)

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GDA 1994 MGA Zone 55

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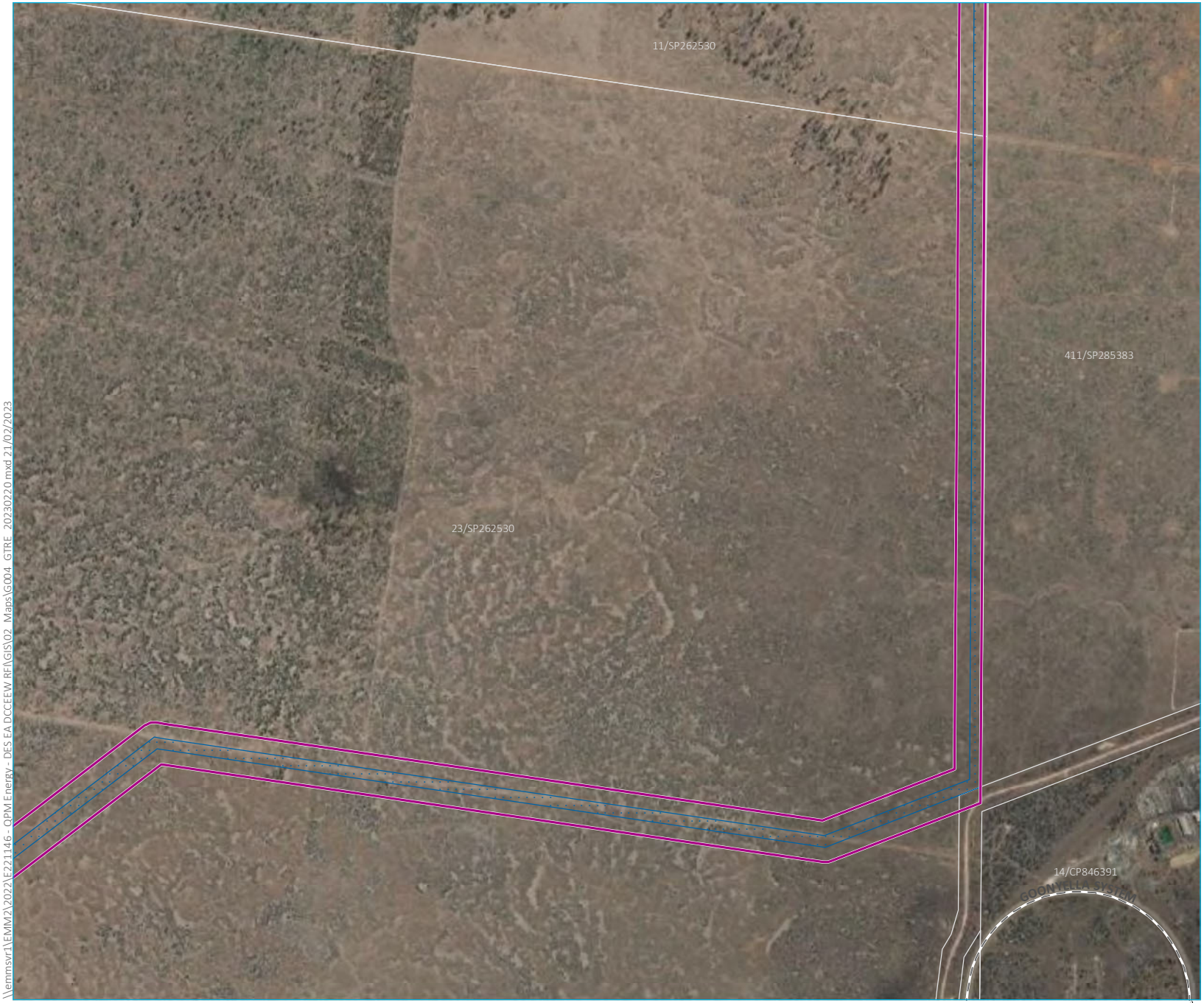
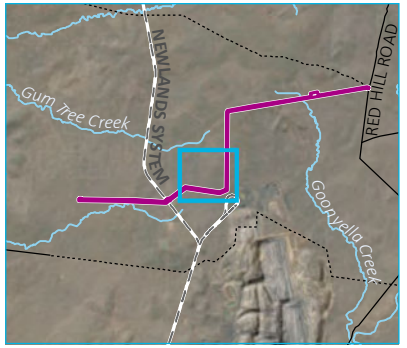
Endangered RE 11.4.9 within the Project area
Map 2 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.2

EMM
creating opportunities





KEY

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- Cadastral boundary

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Source: EMM (2023); DNRME (2022)

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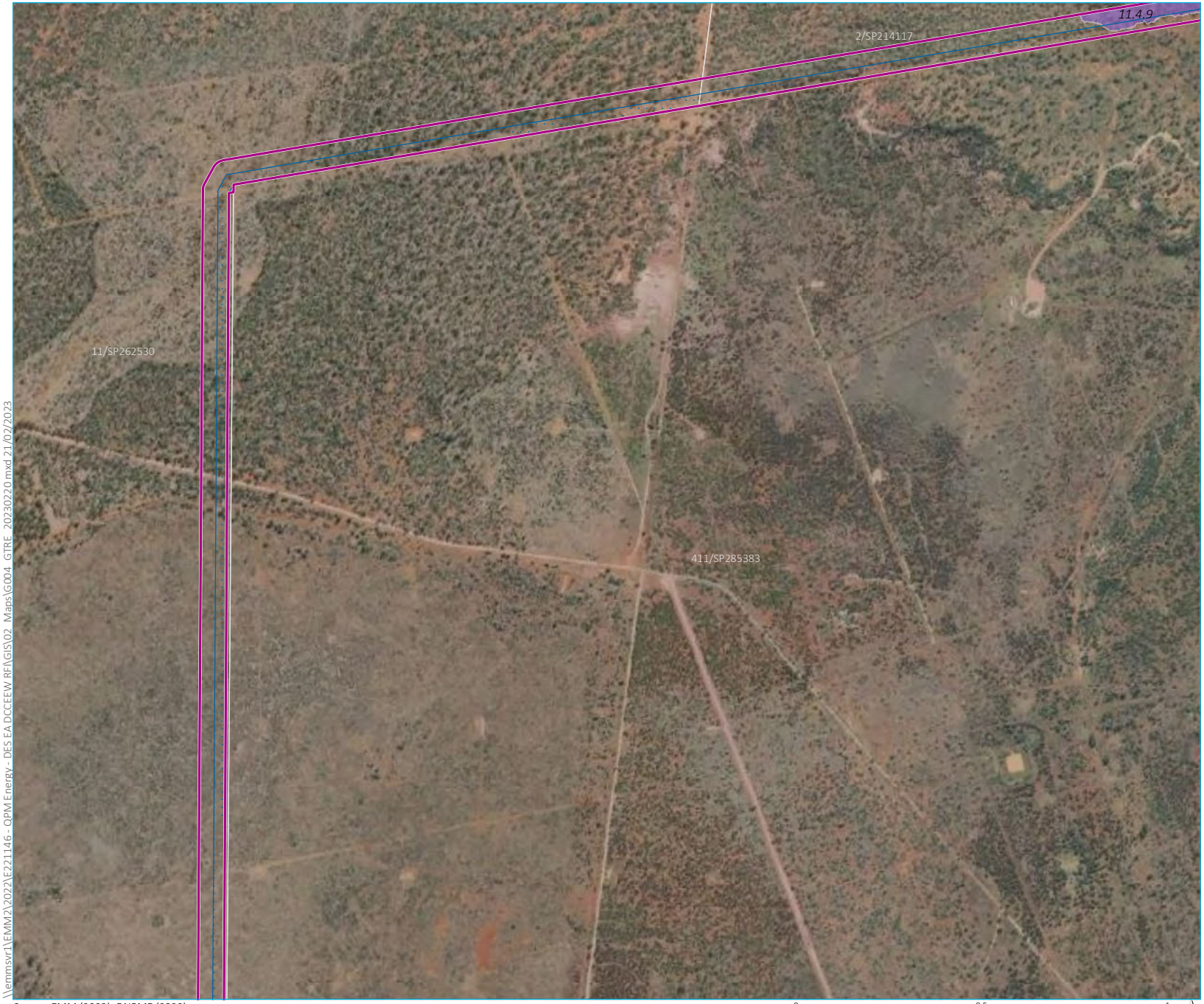
GDA 1994 MGA Zone 55

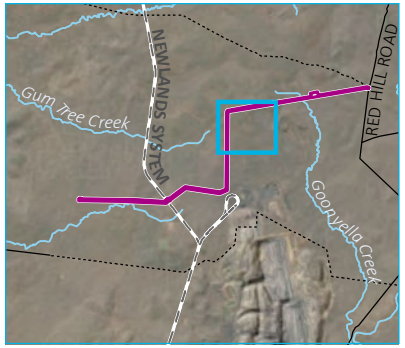
N

Endangered RE 11.4.9 within the Project area
Map 3 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.2

EMM
creating opportunities





KEY

- Project area
- Proposed disturbance footprint
- Rail line
- Minor road
- Vehicular track
- Cadastral boundary

Ground-truthed regional ecosystems

- Remnant - endangered

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Source: EMM (2023); DNRME (2022)

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GDA 1994 MGA Zone 55

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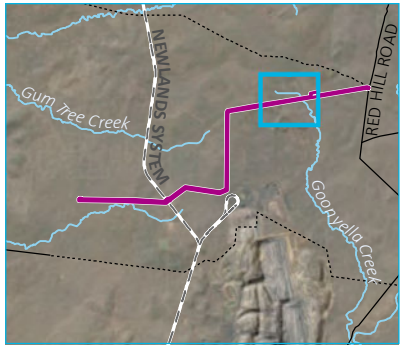
Endangered RE 11.4.9 within the Project area

Map 4 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.2

EMM
creating opportunities



KEY

- Project area
- Proposed disturbance footprint
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary

Ground-truthed regional ecosystems

- Remnant - endangered
- High value regrowth - endangered

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Source: EMM (2023); DNRME (2022)

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GDA 1994 MGA Zone 55

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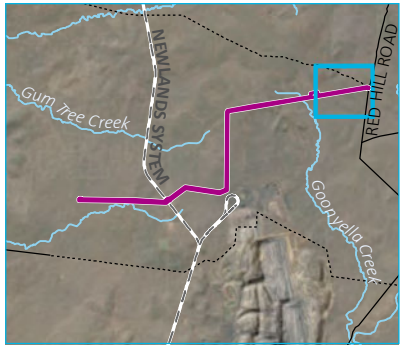
Endangered RE 11.4.9 within the Project area

Map 5 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.2

EMM creating opportunities



KEY

- Project area
- Proposed disturbance footprint
- Electrical transmission line
- Water pipeline
- Rail line
- Minor road
- Vehicular track
- Watercourse/drainage line
- Cadastral boundary

Ground-truthed regional ecosystems

- Remnant - endangered
- High value regrowth - endangered

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Source: EMM (2023); DNRME (2022)

0 0.5 1 m

GDA 1994 MGA Zone 55

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Endangered RE 11.4.9 within the Project area

Map 6 of 6

QPM Energy Project
Environmental Offset Strategy
Figure 6.2

EMM creating opportunities

7 Offset delivery

7.1 Offset Delivery Plan

QPM Energy is proposing to deliver environmental offsets through the following steps:

1. Post project approval, habitat quality assessments will be completed across the impact and preferred offset area to allow offset calculators to be finalised, and final offset areas to be determined.

2. Any offset areas that are needed will be identified and ground-truthed to confirm suitable vegetation and habitat is present. Targeted surveys for Ornamental snake in the preferred offset area will also be completed.

3. Habitat quality assessments will apply the 'Guide to determining terrestrial habitat quality – Methods for assessing habitat quality under the Queensland Environmental Offsets Policy' (DES 2020).

4. Landholder discussions will occur to finalise offset agreements for nominated offset lands.

5. Field surveys within the nominated offset areas will also determine management requirements taking into consideration current and future habitat quality, threats and existing land uses as they relate to each offset value.

6. An OAMP (with final offset calculations) will be submitted to DCCEEW for approval. The OAMP will need to be approved by DCCEEW prior to Project commencement which includes vegetation clearing. OAMP will include those details set out in Section 7.5.

7. Offset areas will be legally secured within 12 months of approval of the OAMP.

7.2 Preferred offset approach

Direct land-based offsets will make up the primary approach for offset delivery, with offset policies requiring at least 90% is land-based. At this present time 100% of Ornamental Snake and endangered RE offsets will be delivered as land-based offsets, although the ability to deliver state based offsets (e.g. endangered RE) through financial contribution is an option.

7.3 EPBC offset calculators

To support an understanding of where suitable offsets can be found, and quantum of offset area that may be needed, a preliminary MNES offset calculator has been prepared for Ornamental Snake based on our field survey results and understanding of what is present on site. These are summarised in sections below. Habitat quality scoring has applied information outlined in the 'EPBC Act How to use the Offsets Assessment Guide' where quality is divided into:

- Site Condition
- Site Context
- Species Stocking Rate.

Habitat quality is a total score out of 10 and EMM have awarded Site Condition (max 4 points), Site Context (max of 3 points) and Species Stocking Rate (max of 3 points).

7.4 Summary of required offset area

7.4.1 Ornamental Snake offset calculators

Table 7.1 EPBC offset assessment guide input justification

Aspect	Score	Justification
Impact site inputs		
Area of habitat (ha)	55.67	The total area of Ornamental Snake habitat in the impact site is 55.67 ha (combining preferred and dispersal habitat)
Quality (1–10) Site Condition (score out of 4) Site Context (score out of 3) Stocking Rate (score out of 3)	8	The quality of Ornamental Snake in the impact site is assessed as follows using the *Offsets Assessment Guide*: • **Site condition** – the Draft Referral guidelines for the nationally listed Brigalow Belt reptiles state gilgai depressions and mounds are important habitat for this species and this habitat is abundant in the impact site. Although the area is subject to grazing, and invasion from pasture grasses the species is still numerous. Within the subject site a number of threats to Ornamental Snake and Ornamental Snake habitat were evident, including: – Land management practices which involves grazing and other selective clearing of Ornamental Snake habitat. – Invasion of habitat by exotic weeds, including exotic grasses. The quality of habitat in the subject site is moderate for this species, with extensive Buffel Grass presence, however, the gilgai landforms clearly still support this species. As such the overall subject site Ornamental Snake habitat scores **2 out of 4** for site condition. • **Site context** – the impact site is within the core area of the distribution of this species. There are numerous records of the species in the study area. Therefore, based on the Draft Referral guidelines for the nationally listed Brigalow Belt reptiles, which defines gilgai as being an important habitat, the impact site is considered an "important area". Therefore the habitat scores a **3 out of 3** for site context in that important habitat is located within and on the margin of the site, and connectivity to these areas will be maintained. • **Species stocking rate** – a large number of this species (44) were recorded during impact site surveys and there are numerous nearby database records. Therefore, the habitat scores a **3 out of 3** for stocking rate. The quality of Ornamental Snake habitat in the impact areas is assessed as being an **8 out of 10.**
Offset site inputs		
Time over which loss is averted (max 20 years)	20 years	This is the time over which changes in the level of risk can be considered, and is equivalent to the time over which the offset area is proposed to be actively managed. A timeframe of 20 years has been applied as this is the length of time over which active management of the property will be in place and is consistent with the offset assessment guide.
Start quality (1–10)	8	Based on the lack of field data from the offset site, it has been assumed that habitat quality will be of a similar nature. There is potential that stocking rate and site context may reduce a point based on the potential for an offset site not being in an area holding such a high density of Ornamental Snake, however, conservatively this has not been accounted for in this preliminary calculator.